

fibrosis assessed by liver transient elastography has not been studied yet. Therefore, we investigated the association of liver steatosis or fibrosis and bone mineral density (BMD), assessed using liver transient elastography (TE) and dual-energy X-ray absorptiometry (DXA), respectively. **Methods:** We performed a retrospective chart review of subjects who underwent evaluation of DXA and TE at Severance Hospital, Seoul, Korea, between February 2012 and December 2014. Patients with chronic liver disease including autoimmune hepatitis, chronic viral hepatitis, alcoholic hepatitis, and drug induced hepatitis, primary biliary cirrhosis, and known heart disease were excluded. BMD was measured at the lumbar spine, femur neck, and total hip using DXA. Significant liver fibrosis was defined as liver stiffness value  $>7.0$  kPa on TE.

**Results:** A total of 73 men and postmenopausal 161 women were enrolled in this study [mean age  $\pm$  SD;  $61.7 \pm 8.3$  years; body mass index (BMI),  $24.5 \pm 3.3$  kg/m<sup>2</sup>]. Of these, 36 (15.4%) had osteoporosis, and 38 (16.2%) had significant liver fibrosis. BMI, aspartate aminotransferase (AST), alanine aminotransferase (ALT), triglycerides (TG), and liver steatosis parameters were higher, and lumbar spine, femur spine, and total hip BMD were lower in subjects with significant liver fibrosis than in those without ( $25.9$  vs  $24.2$  kg/m<sup>2</sup>;  $46.8$  vs  $31.0$  IU/L;  $46.2$  vs  $29.1$  IU/L;  $149.7$  vs  $118.4$  mg/dL;  $284.9$  vs  $258.4$  dB/m; and  $0.848$  vs  $0.924$  g/cm<sup>2</sup>;  $0.650$  vs  $0.702$  g/cm<sup>2</sup>;  $0.786$  vs  $0.849$  g/cm<sup>2</sup>, respectively; all  $p$  value  $< 0.005$ ). Correlation analysis showed that BMD was related to age, sex, BMI, fasting glucose, triglycerides, high density lipoprotein (HDL) cholesterol, and the presence of significant liver fibrosis. Multiple linear regression analysis revealed that significant liver fibrosis was significantly associated with low BMD in lumbar spine BMD (Standardized  $\beta$  [STD  $\beta$ ] =  $-0.13$ ), femur neck BMD (STD  $\beta$  =  $-0.13$ ,  $p$  value =  $0.022$ ), and total hip BMD (STD  $\beta$  =  $-0.15$ ,  $p$  value =  $0.008$ ) after adjustment for age, sex, BMI, and fasting glucose. When controlled for age, sex, BMI, history of diabetes, fasting glucose, ALT, TG, and HDL cholesterol, significant liver fibrosis was independently correlated with low BMD only in femur neck (STD  $\beta$  =  $-0.14$ ,  $p$  value =  $0.034$ ) and total hip (STD  $\beta$  =  $-0.15$ ,  $p$  value =  $0.014$ ).

**Conclusion:** The presence of significant liver fibrosis assessed by TE was independently associated with low BMD in femur neck and total hip in Korean population.

## 0019

Increased Body Weight and Sarcopenic Obesity: Causes of Intertrochanteric Fracture in Non-Osteoporotic Female Patients

Hyung-Min Ji<sup>1</sup>, Ye-Yeon Won<sup>1</sup>, Dong San Jin<sup>1,2</sup>, Jun Han<sup>1</sup>,  
<sup>1</sup>Ajou University School of Medicine, Suwon, Republic of Korea  
<sup>2</sup>Mary Orthopedic Hospital, Beijing, China

**Purpose:** The purpose of this study was to determine if there were any differences between women diagnosed with an intertrochanteric fracture who were categorized into a low BMD group (T-score  $\leq -2.5$ ) and a high BMD group (T-score  $> -2.5$ ). Additionally, we examined the correlation between T-score and intermuscular adipose tissue (IMAT) in different thigh muscles.

**Methods:** This cross-sectional study identified 117 women with intertrochanteric fracture in whom both preoperative computed tomography (CT) scan of the pelvis and dual-energy x-ray absorptiometry (DEXA) were obtained. The patients were divided into high BMD (49 patients) and a low BMD (68 patients) groups. Attenuation of the gluteus maximus, abductor, quadriceps, and hamstring muscles were measured from CT scans of the hip and thigh cross-sectional area. The cross-sectional area of normalized IMAT of the muscles

was also measured. All variables were compared between the two groups.

**Results:** Patients with a high BMD were significantly younger, taller, and heavier. IMAT of the quadriceps was significantly higher in these patients. A moderate correlation was observed between T-score and weight and a weak correlation was detected between T-score and the IMAT ratio of the quadriceps. Body mass index (BMI) was moderately correlated with IMAT of all muscles. T-score was moderately correlated with abductor and quadriceps IMAT ratios in 55–60 kg patients.

**Conclusion:** BMI and body weight were higher and IMAT of the quadriceps increased in non-osteoporotic women with a T-score  $> -2.5$  who sustained an intertrochanteric fracture when compared with those of patients with osteoporosis. This result indicates that increases in body weight and sarcopenic obesity play a role in generating fractures in this population.

## 0021

Regression Analysis between Multiple Osteoporotic Vertebral Fracture and Fracture Risk Factors of Osteoporotic Vertebral Fracture

Ye-Soo Park, Jaewon Lee, Byoungjik Kang, Joonguk Kim, Jaedong Kim, Guri Hospital, Hanyang University College of Medicine, Guri city, Kyunggi-do, Republic of Korea

**Objectives:** Numerous studies had been achieved to elucidate the risk factors of osteoporotic vertebral fracture (OVF) such as bone mineral density, age, steroid, smoking history. However, studies about the risk factors of multiple osteoporotic vertebral fractures are rare. Authors evaluated the risk of multiple osteoporotic vertebral fractures.

**Methods:** Among 527 patients with vertebral fractures from January 2008 to April 2015 in our hospital, 160 patients were enrolled except 367 patients who had non-OVF and lack of data. There were divided into 3 groups; less than 3 acute OVF with no other old OVF (Group 1), greater than or equal to 3 OVF regardless of time of occurrence (Group 2), greater than or equal to 3 acute OVF which occur at the same time (Group 3). We performed a logistic regression analysis as statistical method.

**Results:** The mean age of the patients was  $71.5 \pm 11.4$  years. There are 23 male patients (14.5%), 137 female patients (85.5%). the mean body mass index was  $23.48 \pm 3.64$ , the mean bone mineral density (T-score) was  $-2.99 \pm 1.17$  in the spine,  $-2.37 \pm 1.08$  in the hip. There were no statistically significant in these risk factors; BMI, RA presence, steroid treatment status, smoking, alcohol, treatment of osteoporosis before and after osteoporotic vertebral fractures. However, odds ratio of multiple osteoporotic vertebral fracture was 1.22 higher in their 70s ( $p = 0.02$ ), 1.38 higher in aged 80 or older than in less than 60 ( $p < 0.01$ ), 1.78 higher in who has osteoporosis ( $-2.5 < \text{T-score} < -3.5$ ) ( $p < 0.01$ ), 2.01 higher in who has severe osteoporosis ( $-3.5 < \text{T-score} < -4.5$ ) than who has osteopenia ( $\text{T-score} < -2.5$ ) ( $p < 0.01$ ).

**Conclusions:** Person who has lower bone mineral density or elderly person are associated with multiple osteoporotic vertebral fractures.

## 0022

Incidence of Osteoporotic Fragility Fracture and Secondary Fracture Prevention in Korea

Jin-Hyok Kim<sup>1</sup>, Dong-Ju Lim<sup>1</sup>, Dong-Gune Jang<sup>1</sup>, Se-il Suk<sup>1</sup>, Hoon Choi<sup>2</sup>,

<sup>1</sup>Department of Orthopedic Surgery and Seoul Spine Institute, Sanggye Paik Hospital, Inje University School of Medicine, Seoul,